
Landsat 7 Calibration Parameter File Release Version Description Document

01 Oct 2001



Earth Resource Observation Systems
Data Center
Sioux Falls, South Dakota

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1 Preface

This Calibration Parameter File (CPF) Change Description Document is controlled by the Landsat 7 Data Handling Facility (DHF) Change Control Board (L7 DCCB) and accompanies the release of CPFs for the 4th Quarter of 2001.

Comments and questions regarding this document should be directed to:

Landsat 7 Image Assessment System
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2 Overview

This document details the Calibration Parameter Files (CPFs) released for the quarter beginning 01 October 2001 and the changes made to them.

3 Reason for CPF Issuance and Changes

This release is a routine quarterly release for the 4Q2001 CPF, and also includes refinements to MTF correction parameters, attitude parameters, bias locations and detector gains.

4 List of CPFs in Effect

The following table shows the CPFs in effect for the 4th Quarter of 2001.

Applicable Period	Newly Released CPF
01 October - 31 December 2001	L7CPF20011001_20011231.01
01 July - 30 September 2001	L7CPF20010701_20010930.02
01 April - 30 June 2001	L7CPF20010401_20010630.03
01 January - 31 March 2001	L7CPF20010101_20010331.04
01 October - 31 December 2000	L7CPF20001001_20001231.05
19 July - 30 September 2000	L7CPF20000719_20000930.07
01 July - 18 July 2000	L7CPF20000701_20000718.06
01 April - 30 June 2000	L7CPF20000401_20000630.06
01 January - 31 March 2000	L7CPF20000101_20000331.08
09 December - 31 December 1999	L7CPF19991209_19991231.09
24 November - 08 December 1999	L7CPF19991124_19991208.09
01 October - 23 November 1999	L7CPF19991001_19991123.09
01 July - 30 September 1999	L7CPF19990701_19990930.12
01 April - 30 June 1999	L7CPF19990401_19990630.15

5 List of Changed Units

5.1 New Additions to CPF File Structures:

There were no changes to the CPF file structure with any of the CPFs released this quarter.

5.2 Modifications to Existing CPF Values

The table below details which groups were changed in each of the 13 CPFs released this period. The subparagraphs below the chart describe the changes made to the individual groups.

		GROUP=FILE ATTRIBUTES						GROUP=UT1 TIME PARAMETERS		GROUP=ATTITUDE PARAMETERS		GROUP=MTF COMPENSATION		GROUP=BIAS LOCATIONS		GROUP=DETECTOR GAINS	
Effectivity Dates	File Name																
01 October - 31 December 2001	L7CPF20011001_20011231.01	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
01 July - 30 September 2001	L7CPF20010701_20010930.02	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
01 April - 30 June 2001	L7CPF20010401_20010630.03	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
01 January - 31 March 2001	L7CPF20010101_20010331.04	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
01 October - 31 December 2000	L7CPF20001001_20001231.05	x					x										
19 July - 30 September 2000	L7CPF20000719_20000930.07	x					x										
01 July - 18 July 2000	L7CPF20000701_20000718.06	x					x										
01 April - 30 June 2000	L7CPF20000401_20000630.06	x					x										
01 January - 31 March 2000	L7CPF20000101_20000331.08	x					x										
09 December - 31 December 1999	L7CPF19991209_19991231.09	x					x										
24 November - 08 December 1999	L7CPF19991124_19991208.09	x					x										
01 October - 23 November 1999	L7CPF19991001_19991123.09	x					x										
01 July - 30 September 1999	L7CPF19990701_19990930.12	x					x										
01 April - 30 June 1999	L7CPF19990401_19990630.15	x					x										

5.2.1 GROUP=FILE_ATTRIBUTES

Routine changes to show new filename and effectivity dates.

5.2.2 GROUP=UT1_TIME_PARAMETERS

UT1 time parameters have been updated based on estimated values as computed at the Naval Observatory.

5.2.3 GROUP=ATTITUDE_PARAMETERS

Attitude Parameters have been revised to reflect the results of minor changes detected through sensor alignment calibrations. These parameters reflect alignment changes for the year 2001 only. Parameters for previous CPF periods remain accurate.

5.2.4 GROUP=MTF_COMPENSATION

Parameters used for the MTF resampling method have been updated to reflect improvements based on analysis done recently using the Lake Ponchartrain Bridge. A complete description of the MTF analysis and methodology as well as samples of imagery processed with previous MTF parameters and also images processed using other resampling methods please see the calibration notice regarding the MTF updates on the Landsat website at <http://landsat7.usgs.gov>

5.2.5 GROUP=BIAS_LOCATIONS

Bias location parameters have been updated for the period beginning 01 April 2001 to compensate for subtle changes caused by continued mechanical wear of the scanning mirror assembly and calibration shutter assembly. Although these changes have been gradual and continuous since launch the magnitude of this slow growth has not required updating bias location coefficients until this year. It is expected that these locations will continue to slowly change as the ETM+ instrument ages and that updates to bias location parameters will again be required for CPFs covering future periods.

5.2.6 GROUP=DETECTOR_GAINS

Changes were made to the relative gain parameters for Band 7, Detector 5 to reflect changes detected in the response of that detector. The following description of these changes and the rationale for implementing them was provided by Julia Barsi of the Landsat Project Science Office at NASA's Goddard Space Flight Center:

“Beginning Jan 2001 (sometime between 22 Dec 00 and 03 Jan 01, according to the trending data), a few B7 detectors underwent a change in responsivity. It was most noticeable in D5 rel gain trends, so this was the only one examined initially. On further investigation, we may have uncovered a number of other problems: a slowly changing D5 which may call for individual CPF updates rather than one blanket change, other detectors changing at the Jan 2001 time frame, two detectors (13 and 14) that may show some non-linearities, and perhaps different rel gains between high and low gain states.

Given the short amount of time before the next release in the CPF, we chose to focus only on the D5 change, since that is most obvious and leads directly to striping in bright low gain images. The other issues are not as noticeable in processed imagery because of the lack of magnitude in the changes. However, these other issues will be addressed when the rel gain issue is more fully covered.

6 Operational Changes to be expected with New CPFs

Generally only minor changes to operations or performance expected due to these CPFs.

- Routine updates to the UT1 time parameters could result in slight refinements in geometric accuracy on the order of several meters in the along-track direction.
- Attitude Parameter updates should help maintain geometric/geodetic accuracy, particularly in the cross-track direction.
- The updates to the MTF parameters will be the most noticeable change to users of Landsat 7 data that has been processed with the MTF option. The differences should be readily apparent around areas of sharp contrast change and small, distinct features.
- Updates to the Bias Location parameters will maintain and improve bias values chosen for each scene although these changes should be subtle to users.
- The Detector Gain changes to Band 7, Detector 5 relative gains should reduce striping that was at times visible in regions of high brightness in Band 7.